



AKI Workshop Ras El Bar 8-10 February 2015





THINK FOR YOURSELF!!!





THINK CRITICALLY!!!





CHALLENGE DOGMAS!!!



CRITICAL THINKING

5Whats....!!!!???

What

What

What

What

What



5Whats

What are the changes in AKI for?

What is the Evidence: VALIDITY ?

What is the Relevance: UTILITY ?

What is the RISK:BENEFIT?

What is the COST:BENEFIT?



HOW DOES IT CHANGE MY MANAGEMENT?



CLASSIFIERS

love new classifications...

CLASSIFICATIONS

CKD

CRF

MILD
MODERATE
SEVERE

Prognosis of CKD by GFR
and Albuminuria Categories:
KDIGO 2012

				Persistent albuminuria categories Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30-300 mg/g 3-30 mg/mmol	>300 mg/g >30 mg/mmol
GFR categories (ml/min/1.73 m ²) Description and range	G1	Normal or high	≥90	Green	Yellow	Orange
	G2	Mildly decreased	60-89	Green	Yellow	Orange
	G3a	Mildly to moderately decreased	45-59	Yellow	Orange	Red
	G3b	Moderately to severely decreased	30-44	Orange	Red	Red
	G4	Severely decreased	15-29	Red	Red	Red
	G5	Kidney failure	<15	Red	Red	Red

18

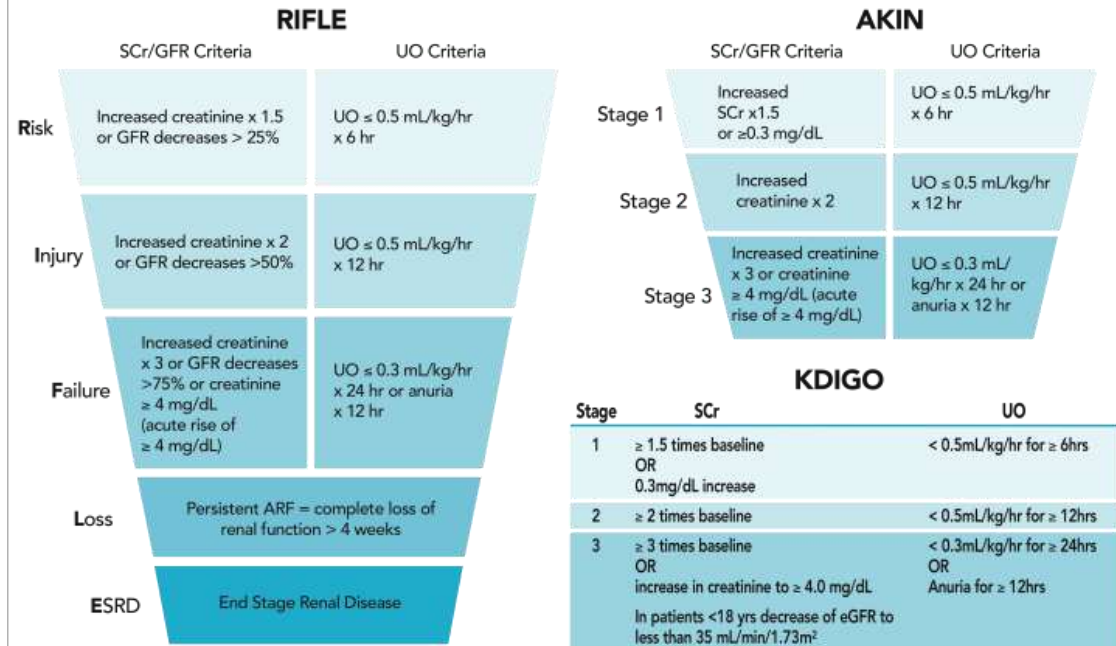
Green: low risk (if no other markers of kidney disease, no CKD); Yellow: moderately increased risk; Orange: high risk; Red, very high risk.

3 to 18

AKI Classification

ARF
Pre-Renal
Renal
Post-Renal

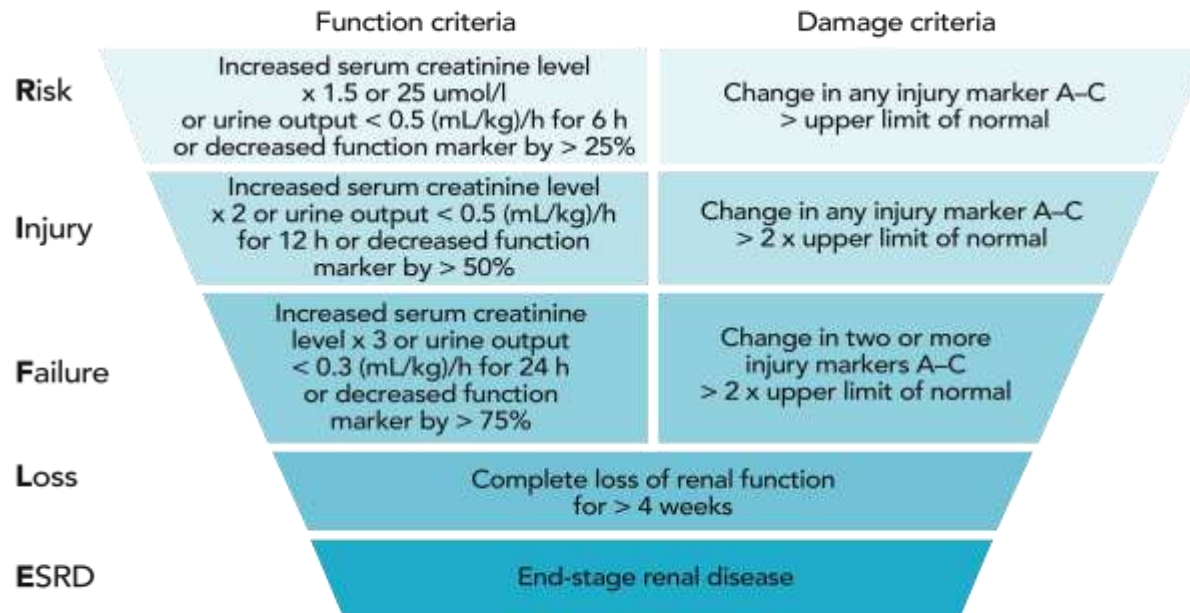
Figure 1. Summary of RIFLE, AKIN, and KDIGO Criteria.



3 to 5

AKI Classification

Figure 4. Theoretical next generation of adapted RIFLE criteria for diagnosis and classification of AKI.



Reprinted with permission from reference 36.

3 to 8

AKI

“Epidemiologists”



Clinical Nephrologists



What can I LEARN from you?

What can I DO for you?



HOW DOES IT CHANGE MY MANAGEMENT?



CASE STUDY

68 YEAR OLD WITH SCR 2MG/DL FOR THE LAST 5 YEARS

PRESENTS WITH SCR: 5mg/dl

URINE OUTPUT <400ML/24H

URINALYSIS: PROTEINURIA/HEMATURIA

URINE MICROSCOPY: RBC CASTS

HOW TO YOU MANAGE THIS PATIENT?



CASE STUDY

68 YEAR OLD WITH SCR 2MG/DL FOR THE LAST 5 YEARS

PRESENTS WITH SCR: 4MG/dl

URINE OUTPUT <400ML/24H

URINALYSIS: PROTEINURIA/HEMATURIA

URINE MICROSCOPY: RBC CASTS

AKI STAGE 3

HOW TO YOU MANAGE THIS PATIENT?



5Whats

What are the changes in AKI for?

What is the Evidence: **VALIDITY** ?

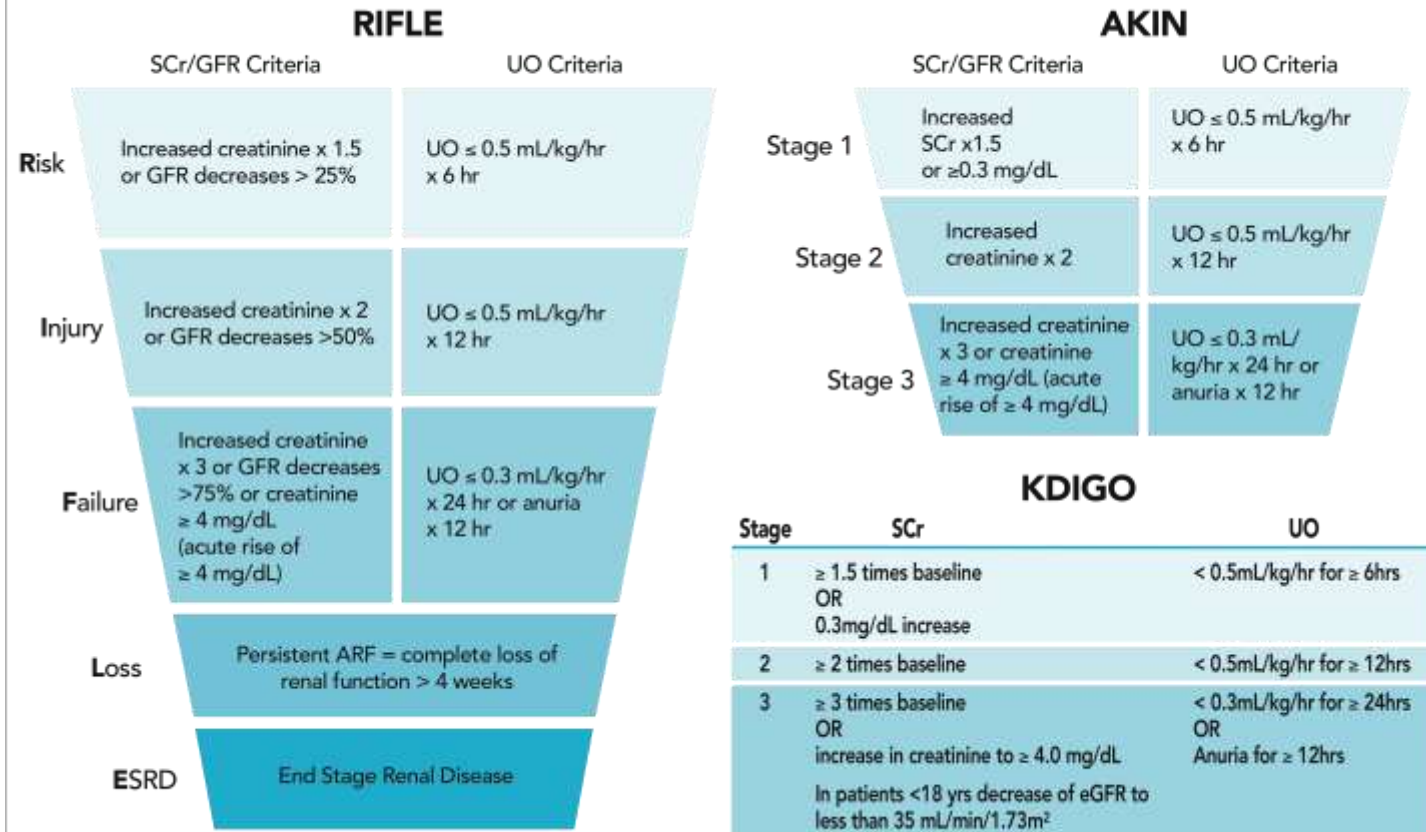
What is the Relevance: **UTILITY** ?

What is the **RISK:BENEFIT**?

What is the **COST:BENEFIT**?

AKI Classification

Figure 1. Summary of RIFLE, AKIN, and KDIGO Criteria.



The Limitations of sCr in AKI

1. Late Changes
2. Affected by Sarcopenia
3. Affected by Nutrition
4. Affected by Hydration
5. Affected by Metabolic interference with assay
6. Affected by Drug Therapies

The Limitations of eGFR in AKI

eGFR NOT Applicable to AKI



AKI-CKD

“Epidemiologists”



What can I LEARN from you?

Clinical Nephrologists



What can I DO for you?



BIOMARKERS WHAT FOR?



AKI – Progression

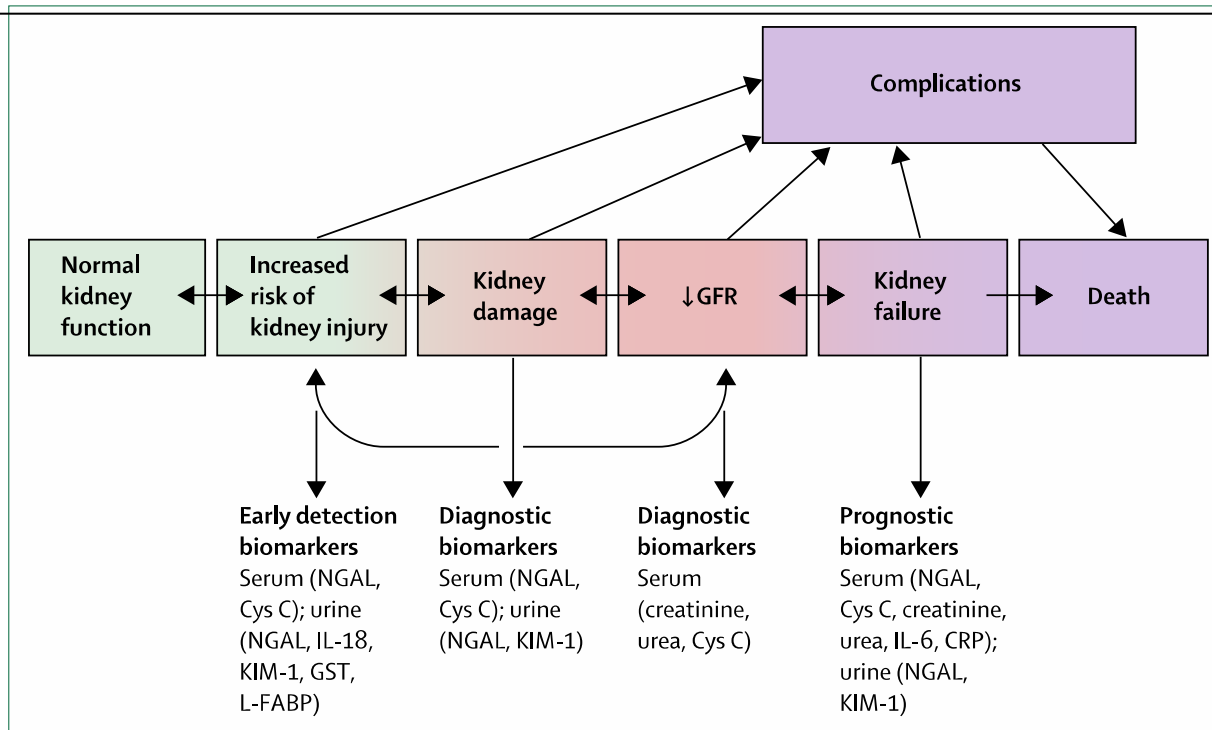


Figure 3: Evolution of acute kidney injury

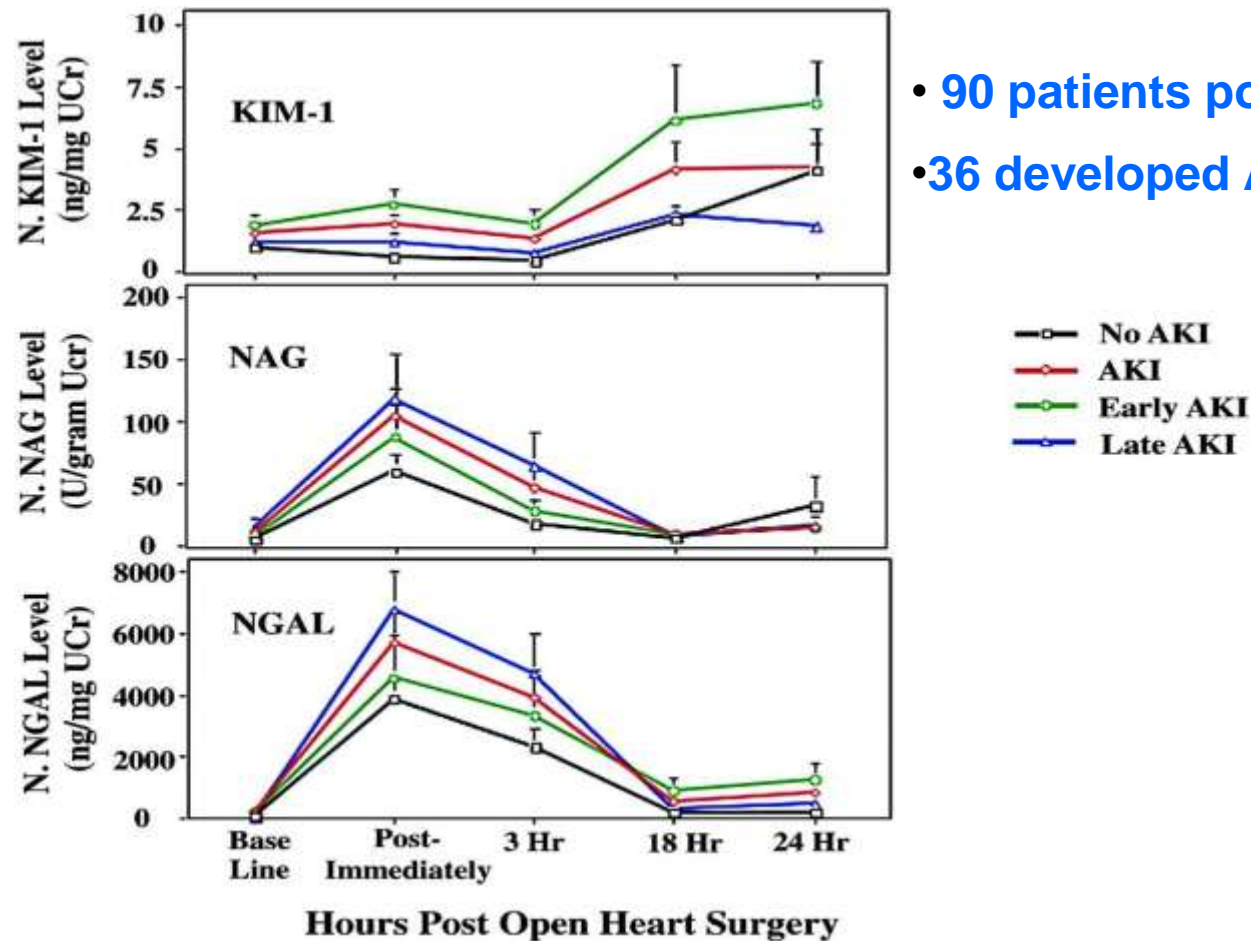
Injury begins before excretory function is lost (ie, decreased GFR) and can in some cases be detected by the measurements of biomarkers. Such biomarkers can also be used for diagnostic and prognostic assessment. GFR=glomerular filtration rate. NGAL=neutrophil gelatinase-associated lipocalin. Cys C=cystatin C. KIM-1=kidney injury molecule 1. IL-18=interleukin 18. GST=glutathione-S-transferase. L-FABP=liver fatty-acid-binding protein. CRP=C reactive protein. IL-6=interleukin 6.

K/DOQI 2002

CKD Classification

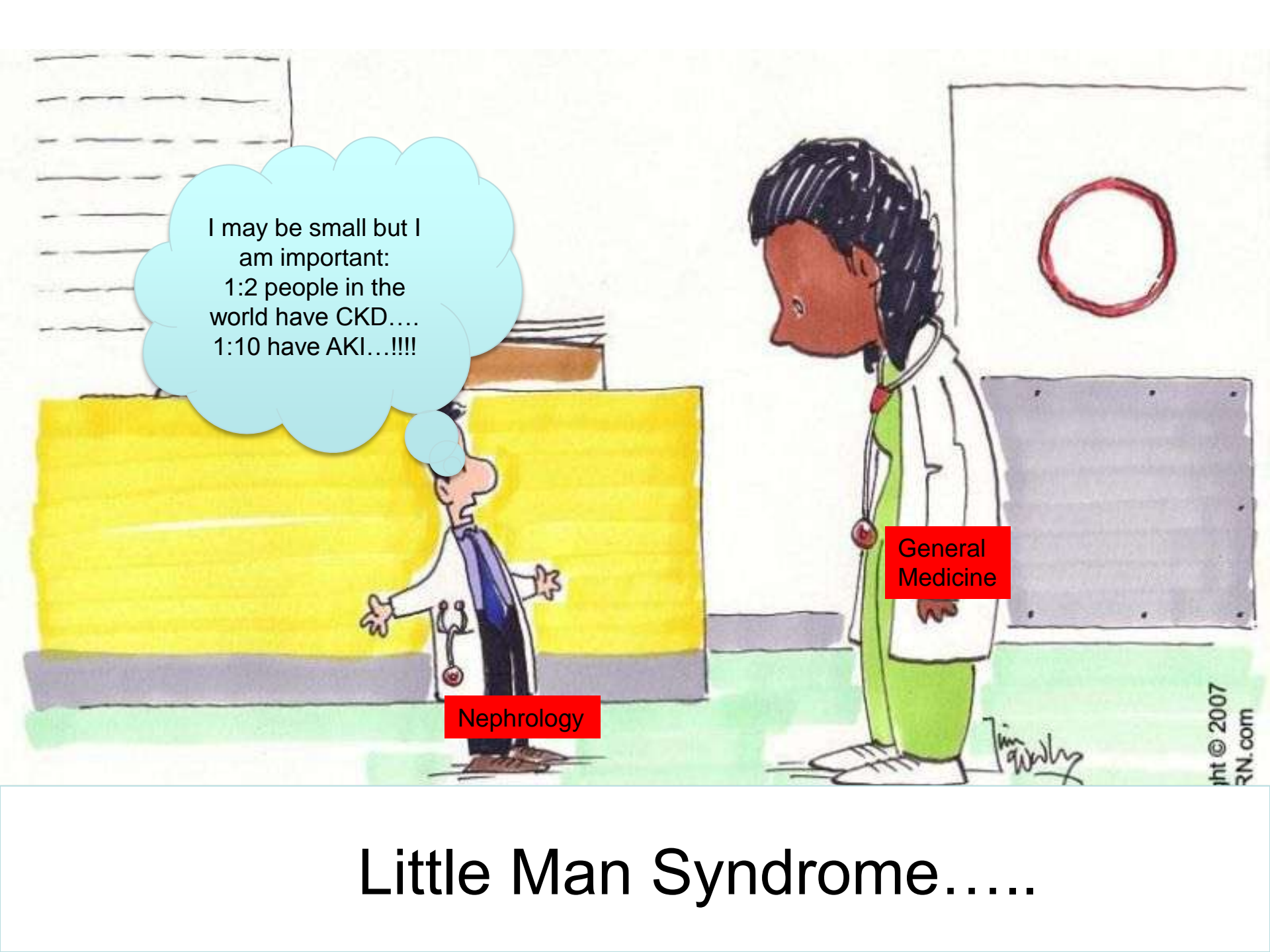
Stage	Description	GFR
1	Kidney damage with normal GFR*	>90ml/min
2	Mild renal insufficiency* Microalbuminuria	89-60
3	Moderate renal insufficiency	59-30
4	Severe renal insufficiency	29-15
5	Kidney Failure/ERF/ESRD	<15

Pattern of urinary biomarker expression after cardiac surgery



- 90 patients post cardiac surgery
- 36 developed AKI – all after 24 hours

Han W K et al. CJASN 2009;4:873-882

A cartoon illustration showing two doctors in a hallway. On the left, a small doctor in a white coat and blue tie stands next to a large yellow rectangular object. A thought bubble above him contains text about the prevalence of kidney disease. On the right, a taller doctor in a white coat and green pants stands looking at the smaller doctor. A red box with the text 'General Medicine' is next to the taller doctor. Another red box with the text 'Nephrology' is next to the smaller doctor. The background includes a window with horizontal blinds and a door with a red circular handle. The artist's signature 'Jim Gasky' is at the bottom right, along with the copyright notice 'ht © 2007 RN.com'.

I may be small but I
am important:
1:2 people in the
world have CKD....
1:10 have AKI...!!!!

Nephrology

General
Medicine

Little Man Syndrome.....

BIG PHARMA!!!!!!

If you want to sell ore drugs...change the Definitions....

Dyslipidemia....no need to check Cholesterol....STATINS for ALL

Osteoporosis...>1SD...BISPHOSPHONATES FOR ALL

Hypertension....Pre-Hypertension

Diabetes....Pre-Diabetes...METFORMIN FOR ALL

CKD...Microalbuminuria & .eGFR< 60 for ALL...ACEi FOR ALL

AKI....Biomarkers of Damage...????????



HOW DOES IT CHANGE MY MANAGEMENT?

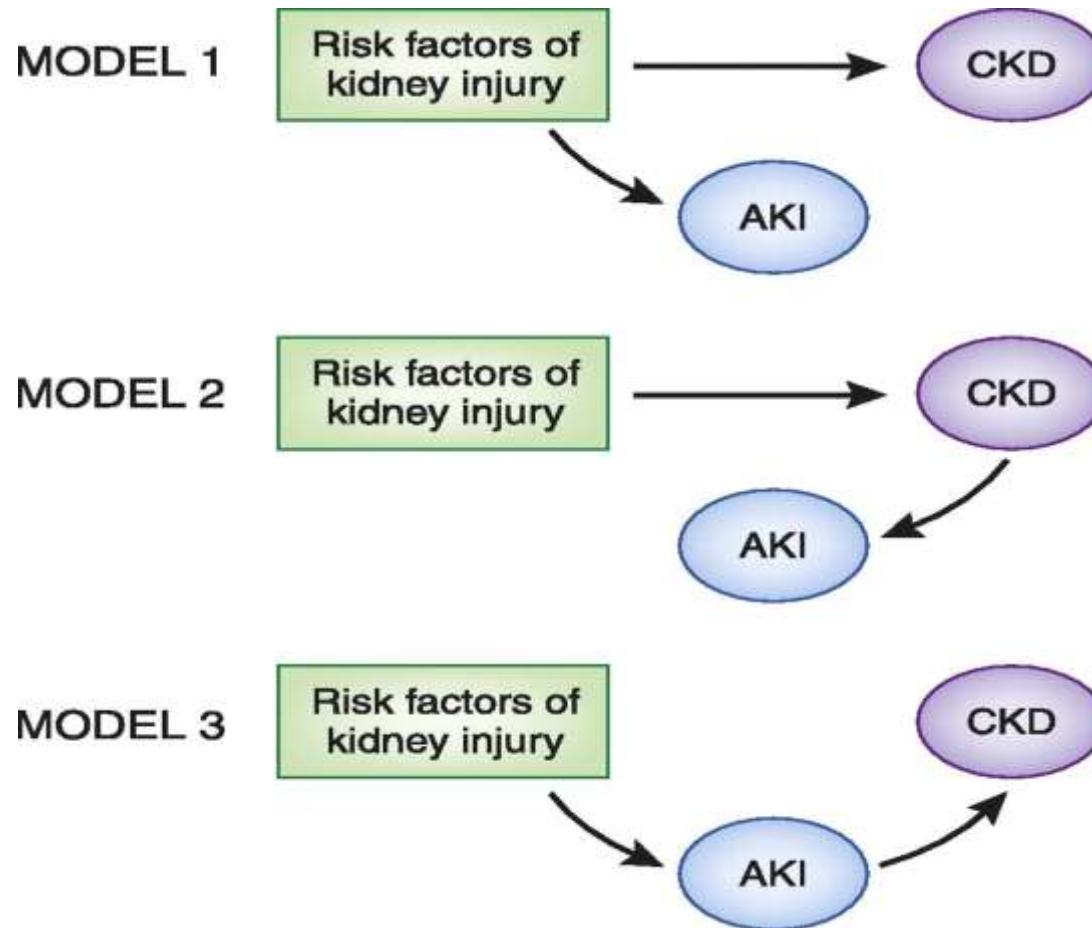




Is AKI a Cause of CKD?!



Three hypothetical causal models of the AKI-CKD association



Rifkin D E et al. JASN 2012;23:979-984

Drug Nephrotoxicity

Panel 1: Drugs that contribute to acute kidney injury

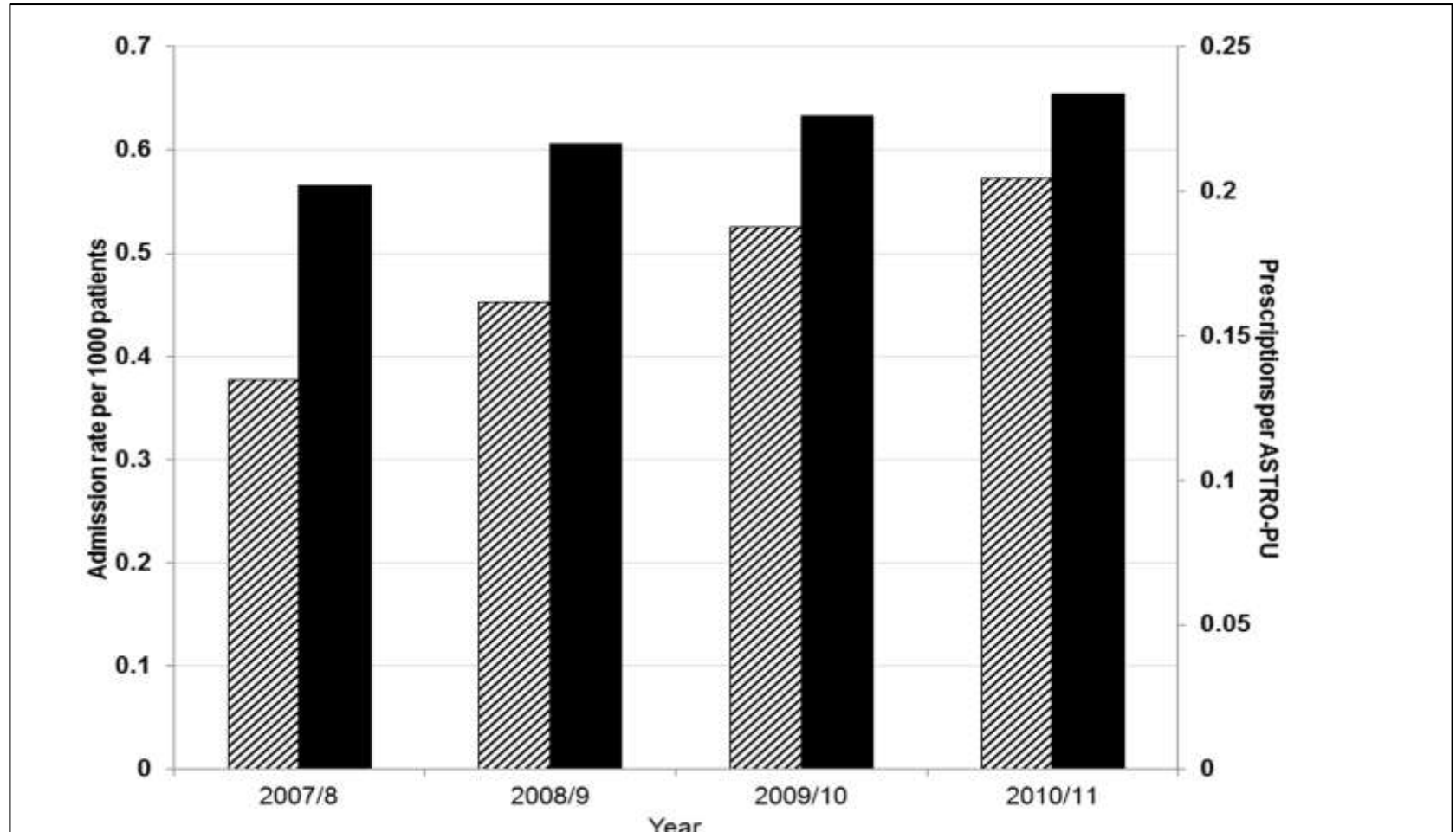
- Radiocontrast agents
- Aminoglycosides
- Amphotericin
- Non-steroidal anti-inflammatory drugs
- β -lactam antibiotics (specifically contribute to interstitial nephropathy)
- Sulphonamides
- Aciclovir
- Methotrexate
- Cisplatin
- Ciclosporin
- Tacrolimus
- Angiotensin-converting-enzyme inhibitors
- Angiotensin-receptor blockers

ACE Inhibitor and Angiotensin Receptor-II Antagonist Prescribing and Hospital Admissions with Acute Kidney Injury: A Longitudinal Ecological Study

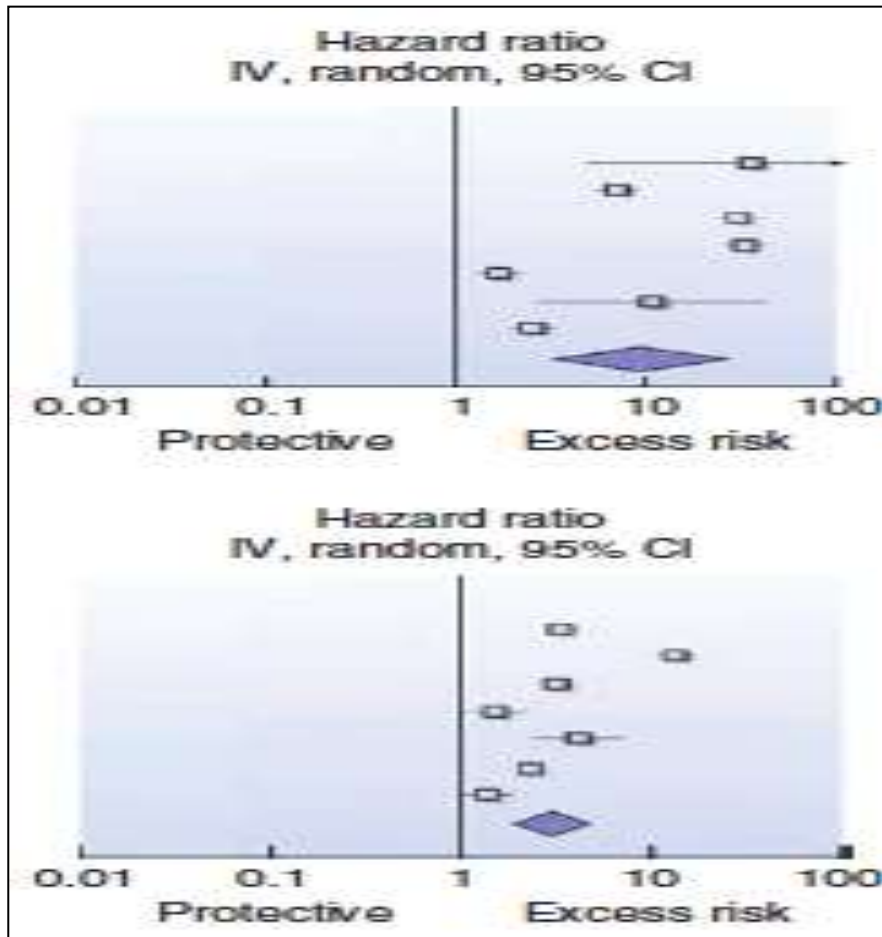
Laurie A. Tomlinson^{1*}, Gary A. Abel², Afzal N. Chaudhry³, Charles R. Tomson⁴, Ian B. Wilkinson¹, Martin O. Roland², Rupert A. Payne²



AKI // RAS Inhibition



What is the relationship between AKI and CKD ?

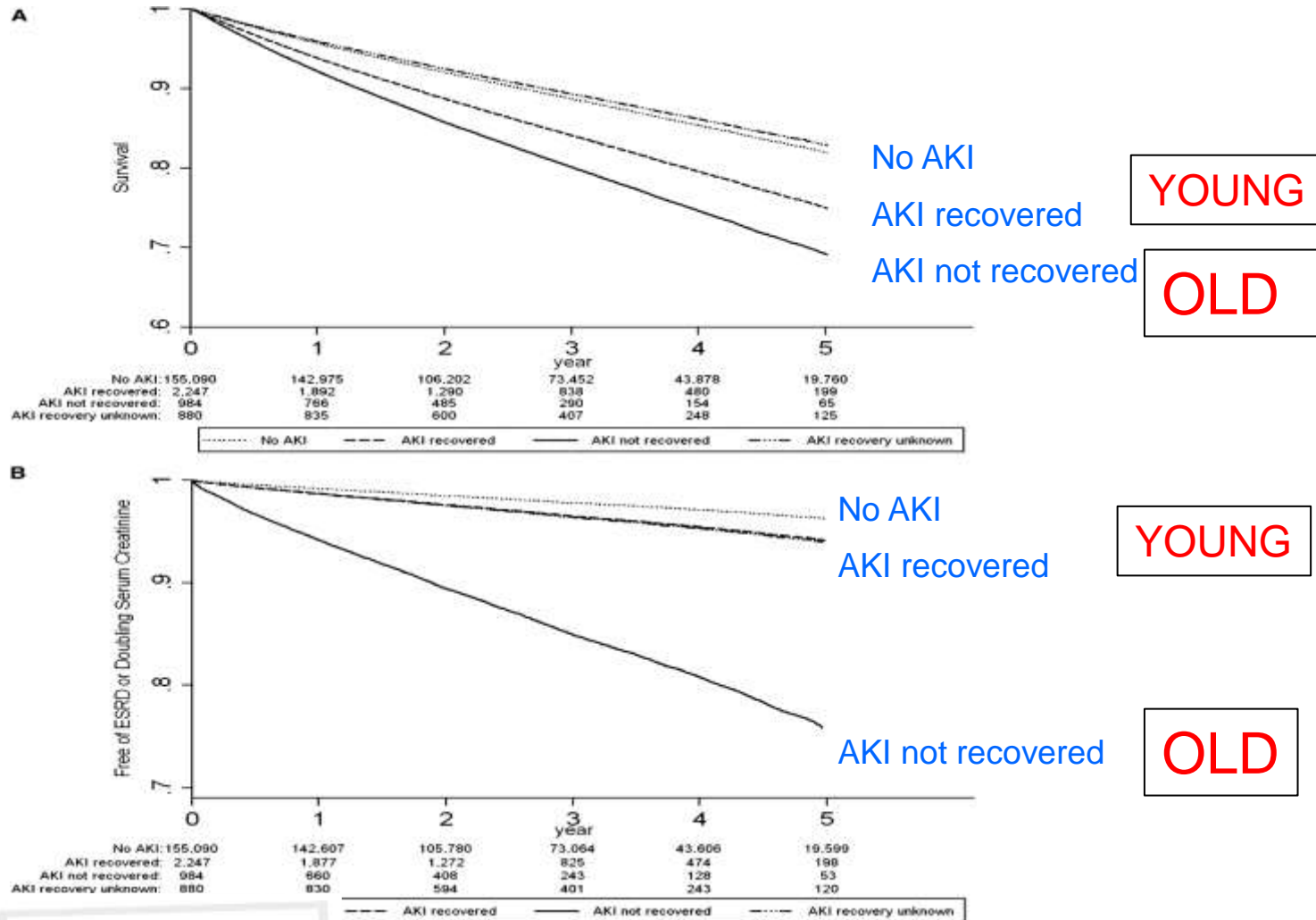


Risk of CKD
hazard ratio 8.8, 95% CI
3.1–25.5

Risk of ESRD
HR 3.1, 95% CI 1.9–5.0

Renal recovery after AKI

Associated with improved patient and renal survival



Pannu N et al. CJASN 2012 doi:10.2215/CJN.06480612



HOW CAN WE PREVENT AKI?



AKI 0 by 25

Most Common Cause of AKI Worldwide?

AKI 0 by 25

Most Common Cause of AKI Worldwide?

DEVELOPING COUNTRY

YOUNG

DEHYDRATION

INFECTIONS/MALARIA

OBSTETRICS (25%)

AKI 0 by 25

Most Common Cause of AKI Worldwide?

DEVELOPED COUNTRY

OLD

T2DM-CVD-CKD

DRUG NEPHROTOXICITY

SURGERY/CARDIAC

AKI 0 by 25

AKI PREVENTION

IS NOT A NEPHROLOGIST PROBLEM!

PRIMARY CARE PHYSICIANS

NON NEPHROLOGISTS

INFECTIOUS DISEASE SPECIALISTS

SANITATION

CLEAN WATER





THINK CRITICALLY!!!

